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Determination of the risk factors and delirium in the intensive care unit

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ABSTRACT

Aim: The objective of the present study is to increase nurses' awareness of delirium risk factors, make nurses gain competence in using Nursing Delirium Screening Scale (Nu-DESC), and improve the quality of care by detecting delirium early in intensive care unit patients.

Material and Method: The research is a descriptive and correlational study. The sample consisted of 55 patients in an intensive care unit. Data of the study was collected with the Personal Information Form, the Richmond Agitation and Sedation Scale, the Glasgow Coma Scale, and the Nu-DESC.

Results: The majority of patients (89%) demonstrated the symptoms of anxiety and agitation. There was a significant correlation between age and the day delirium was detected and the Nu-DESC. In the study, isolation need, ventilator support, and pain were determined as risk factors.

Conclusion: The results of the study revealed the necessity of using measurement tools for the early detection of delirium in clinical practice by nurses.

Keywords: Delirium, intensive care unit, nursing, risk factors

INTRODUCTION

Delirium is defined as a disorder of consciousness, cognition, attention, and perception (1). According to the International Classification of Diseases and the Diagnostic and Statistical Manual of Mental Disorders, delirium is an acute disorder of attention, cognition, and awareness (2). These symptoms are usually of sudden onset, and they fluctuate transiently throughout the day (1). Delirium is frequently encountered in intensive care units (ICU) due to reasons such as multiple invasive interventions applied in the ICU, mechanical ventilation, physical restriction, lack of day and night concept due to the physical conditions of the ICU, alarm and monitor sounds (3). For this reason, it is also known as 'intensive care psychosis' and 'intensive care syndrome' (4,5). The prevalence of delirium in ICU varies between 30% and 75.6% (6,7). The hospital stay and the length of stay in the ICU of patients with delirium are prolonged, resulting in an increase in hospital costs and mortality rates after discharge (8). Therefore, early diagnosis of delirium is important (9). Increasing awareness about the diagnosis and types of delirium can affect the rates of early detection; thus, delirium can be generally prevented (10). Although delirium is an important problem frequently encountered among patients in the ICU, it is usually not noticed by healthcare team members in the early period (11). Increasing the nurses' awareness of delirium and minimizing the negative consequences of delirium can be possible with the knowledge of delirium management (12,13). In the intensive care unit, preventive approaches and treatment for patients at risk for delirium can be realized with the cooperation of healthcare team members (14-16). The nurse, one of the healthcare professionals in the ICU, plays a primary role in patient communication and care (17). Intensive care nurses are team members who easily notice every physiological and behavioral change, as they constantly observe the patients. In this sense, nurses play an important role in the evaluation and early diagnosis and treatment of patients at risk of delirium (14-16). It is necessary for nurses to have knowledge and competence in this regard for the effective

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prevention of delirium. When the nursing literature in Turkey is examined, it is striking that there is a limited number of studies aimed at identifying patients at risk of delirium among nurses working in the ICU. Our aim is to increase nurses' awareness of delirium risk factors, make nurses gain competence in the use of Nu-DESC, and improve the quality of care by detecting delirium early in ICU patients.

MATERIAL AND METHOD

The study was carried out with the permission of Gaziantep University Clinical Researches Ethics Committee (Date: 07.02.2022, Decision No: 2022/03). Before the data were collected, the participants were informed about the research and their written consents were obtained. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The research is a descriptive and relation-seeking research. This research was conducted with patients in the General Intensive Care Unit of a patient. The sample of the study included the patients who were older than 18 years of age, who were not in a coma (The Richmond Agitation and Sedation Scale (RASS): between -3 and +4, the GCS: 10 or higher), and who did not have a psychiatric diagnosis. The sample size's confidence interval was α=0.05, the power of the test (1-β) was 0.95, and a total of 45 patients were calculated. During this study, 55 patients were reached and the study was completed in 55 patients.

Data Collection Tools

Personal information form: This form consists of questions that include sociodemographic and disease-related information.

Richmond agitation and sedation scale (RASS): RASS aims at a good observational evaluation. First of all, the sedation status of the patient is evaluated. If the patient is under deep sedation, unconscious, or if the RASS scores are between -4 and -5, an evaluation cannot be made. In this situation, which is called coma or stupor, it would not be appropriate to evaluate for delirium, as the patient cannot react to anything. However, after the patient wakes up (RASS> -3), he/she can be evaluated for delirium. It is based on a scoring system between +4 and -5 (7). 4 levels (+1 to +4) are used for anxiety and agitation, the level (0) is used to indicate alertness and calmness, and 5 levels (-1 to -5) are used to indicate sedation (18).

Glasgow coma scale (GCS): It is one of the physiological scoring systems used to monitor the clinical progress of patients from the moment they are admitted to the hospital and during their stay. It is a simple, objective scoring system that is frequently used to determine the previous state of the patient, define the state of consciousness, express the change in the level of consciousness, and measure the degree of coma in the most reliable way. The GCS's maximum point value is 15. Those with a GCS score of 8 or lower are considered to be in a coma (19). A GCS score of 10 or higher was taken for delirium evaluation in the present study.

Nursing delirium screening scale (Nu-DESC): Since delirium is a difficult situation to diagnose, Gaudreau et al. (20), who aimed to develop a scale with a low workload but sufficient to diagnose it, developed the Nu-DESC in 2005. The Turkish adaptation was made by Karataş (2019), and it was found to be valid and reliable in diagnosing delirium in the intensive care patients (21). It is a tool that can be defined very easily and quickly in the clinical practices of nurses. In addition to providing an easy evaluation of delirium at the bedside, it is recommended for routine use of patients in ICU, as characteristic fluctuations can be witnessed (22). A score between 0 and 2 is given for each item, and a maximum of 10 points can be obtained from the scale (23). It is reported that the threshold value for delirium is two (21). The Nu-DESC used in many countries is based on observation only and requires an estimated time of 1 minute. Also, no training is required for the use of this scale.

Research Process

The personal information form to identify the sociodemographic characteristics of patients, the RASS to determine the state and severity of agitation, the GCS to evaluate the consciousness-unconsciousness, and the Nu-DESC to evaluate the status of delirium were applied twice a day as day and night shifts.

The RASS and Glasgow coma scale were first applied to the patient who came to the ICU. The Nursing-Delirium Screening Scale was applied to those who received RASS -3 or higher and those who were not in a coma. If delirium was detected in the patient at the initial evaluation, follow-up was terminated. Those who were in a coma or who had the RASS between -4 and -5 were included in the study when their condition improved. Patients who were not found to have delirium in the initial evaluation were followed up for delirium during their stay in the ICU. When delirium was detected in the follow-up, the process was terminated.

Data Analysis

Descriptive statistics, mean and standard deviation, t-test, Anova, X^2 test, and correlation analysis were used in the analysis of the data. A value of $p<0.05$ was considered statistically significant.

RESULTS

The mean age of the patients in our study was 65.4±17.6, and most of them (88.9%) were over 41 years old. 69.1% of the patients were male, and 90.9% of them were married. When the educational level was examined, it was found that the majority of the patients (30.9%) were primary school graduates, their income was mostly at a moderate level (80%), and 69.1% of them were unemployed. 63.6% of the patients had a surgery. 83.6 of the patients had a chronic disease, with the most common high blood pressure and heart failure. 14 patients received ventilator support due to respiratory problems. 10 patients needed isolation. 60% of patients in the ICU had a diagnosis of delirium on days 2 and 3. The majority of patients (89%) demonstrated the symptoms of anxiety and agitation. More than half of the patients (59.3%) in the ICU were hospitalized for 1-7 days. The patients' discharge from the ICU was in the form of discharge/referral at a rate of 72.7% (**Table 1**).

Table 2 presents the GCS and RASS scores of the patients in the ICU. For the evaluation of delirium, the GCS score was taken as 10 or higher, and it was determined that it concentrated on 13 (21.8%), 14 (30.9%), and 15 (29.1%) points. When the RASS was evaluated, it was determined that the patients had high anxiety-agitation rates (from +1 to +4).

Table 2. The GCS and RASS scores of the patients in ICU

GCS	n	%	RASS	n	%
10 points	2	3.6	+4	21	38.2
11 points	5	9.1	+3	17	30.9
12 points	3	5.5	+2	10	18.2
13 points	12	21.8	+1	1	1.8
14 points	17	30.9	0	3	5.5
15 points	16	29.1	-1	1	1.8
			-2	2	3.6
Total	55	100.0	Total	55	100.0

GCS: Glasgow Coma Scale, RASS: Richmond Agitation and Sedation Scale

The distribution of the conditions of patients in the ICU according to Nu-DESC is presented in **Table 3**. In the first 24 hours, the rate of disorientation was 18.2%, the rate of inappropriate behavior was 47.3%, the rate of inappropriate communication was 16.4%, the rate of illusion/hallucination was 9.1%, and the rate of psychomotor retardation was 12.7%. In the following days, the increasing rates in these areas attracted attention. Between the 4th and 7th days in the ICU, these rates were 58.2%, 96.4%, 67.3%, 30.9%, and 36.4%, respectively.

In the correlation analysis, there was a weak and significant positive correlation between age and the Nu-DESC ($p<0.05$), and a moderate to very significant negative correlation was determined between the day when delirium was detected and the Nu-DESC ($p<0.05$) (**Table 4**).

Table 1. Distribution of the characteristics that identify patients

	n	%
Age		
40 years old or younger	6	11.1
41 years old or older	49	88.9
Gender		
Female	17	30.9
Male	38	69.1
Marital Status		
Married	50	90.9
Single	5	9.1
Educational Level		
Illiterate	14	25.5
Literate	16	29.1
Primary School	17	30.9
Middle School-High School	8	14.5
Employment Status		
Employed	17	30.9
Unemployed	38	69.1
Income Level		
Low	8	14.5
Moderate	44	80.0
Good	3	5.5
Ventilator Support (Respiratory Distress)		
Present	14	25.5
Absent	41	74.5
Isolation Need		
Present	10	18.2
Absent	45	81.8
Surgery		
Present	35	63.6
Absent	20	36.4
Chronic Diseases		
Absent	9	16.4
Diabetes Mellitus (DM)	10	18.2
High Blood Pressure (HBP, Heart Failure)	19	34.5
Metabolic Syndrome (DM, HBP, kidney failure)	6	10.9
Sepsis	11	20
Delirium Detection		
During admission to intensive care	9	16.4
On the 2nd or 3rd day	33	60.0
Between the 4th or 7th day	12	21.8
Absent	1	1.8
Number of Days in ICU		
Between 1 and 7 days	33	59.3
8 days or more	22	40.7
Discharge from the ICU		
Discharge/Referral	40	72.7
Death	15	27.3
General Condition in ICU		
Anxiety-Agitation	49	89
Calm/Awake	3	5.5
Sedation	3	5.5
TOTAL	55	100.0

Table 3: Distribution of the conditions of intensive care patients by Nu-DESC

Variables	On the 1st day		On the 2nd or 3rd day		Between the 4th and 7th days	
	Yes n/%	No n/%	Yes n/%	No n/%	Yes n/%	No n/%
Disorientation	10/18.2	45/81.8	17/30.9	38/69.1	32/58.2	23/41.8
Inappropriate behavior	26/47.3	29/52.7	41/74.5	14/25.5	53/96.4	2/3.6
Inappropriate communication	9/16.4	46/83.6	19/34.5	36/65.5	37/67.3	18/32.7
Illusion/hallucination	5/9.1	50/90.9	7/12.7	48/87.3	17/30.9	38/69.1
Psychomotor retardation	7/12.7	48/87.3	53/96.4	2/3.6	20/36.4	35/63.6

Nu-DESK: Nursing Delirium Screening Scale

Table 4. The relationship between patients' Nu-DESC mean scores and some characteristics

Variables	Nu-DESC
Age	r= 0,361 * p=0.007
The day when delirium was detected	r= -0,591 p=0.001

Nu-DESK: nursing delirium screening scale, *r: correlation analysis

In **Table 5**, some characteristics of the patients are compared according to the Nu-DESC mean scores of the patients. As a result of the statistical analysis, a statistically significant difference was found between isolation need, ventilator support, pain, and Nu-DESC ($p<0.05$).

DISCUSSION

Delirium is a common neurological and behavioral problem in hospitalized patients (24,25). Delirium can cause adverse outcomes such as prolonged mechanical ventilation, longer ICU stay, high mortality, and higher cost of care (1). Therefore, early detection and intervention gain importance in handling delirium.

Although delirium is preventable and reversible, it predisposes patients to longer hospital stays and reduced quality of life (26,27). In the present study, more than half (59.3%) of the patients stayed in the ICU between 1 and 7 days. The Nu-DESC mean scores of those who stayed in the ICU for longer than one week were found to be higher; however, there was no statistical significance. Delirium symptoms are characterized by blurred or fluctuating levels of consciousness, limited attention, and disorientation (28). In the current study, when disorientation, inappropriate behavior, inappropriate communication, illusion/hallucination, and psychomotor retardation were evaluated according to Nu-DESC, it was found that the rate of deterioration in these areas increased as the length of hospital stay. A long hospital stay may have increased the risk of delirium by affecting the physiological and cognitive statuses, and patients may have stayed in the ICU for longer as a result of developing delirium.

It has been reported in the studies that delirium starts on average between the 2nd and 3rd day after admission to the ICU (29). In the present study, delirium was detected in the majority of patients (60%) on the 2nd and 3rd days. It was determined that the majority of intensive care patients in the current study demonstrated the symptoms of anxiety and agitation. The Nu-DESC mean scores of agitated patients were high. It was found that patients who needed isolation presented high delirium symptoms. Early detection of delirium with delirium screening tools for intensive care patients can minimize

Table 5: Comparison of the Nu-DESC mean scores and some characteristics of patients

Variables		n	X±SD	Test - p values
Age	40 years old or younger 41 years old or older	6 49	3.81±1.83 4.00±2.00	t=0.230* p>0.05
Gender	Male Female	38 17	4.07±1.83 3.29±1.75	t=1.483 p>0.05
Chronic Diseases	Present Absent	46 9	4.00±2.06 3.80±1.80	t=0.290 p>0.05
General Condition	Calm/Awake Anxiety-Agitation Sedation	3 49 3	3.33±2.5 3.87±1.86 3.66±0.57	F=0.134** p>0.05
Isolation Need	Present Absent	10 45	4.90±2.23 3.60±1.67	t=2.090 p=0.041
Days in ICU	Between 1 and 7 days 8 days or more	33 22	3.75±1.86 3.95±1.80	t= -0.387 p>0.05
Ventilator Support	Present Absent	14 41	5.57±1.91 3.24±1.39	t=4.896 p=0.001
Pain	Present Absent	30 25	5.06±1.57 2.36±0.63	t=8.054 p=0.001
Discharge from ICU	Discharge/Referral Death	40 15	3.67±1.68 4.26±2.18	t= - 1.067 p>0.05

Nu-DESK: nursing delirium screening scale, *t test: independent sample t test, **F test: one way anova

the use of sedative drugs, which are commonly used in the treatment of agitation among the patients (26). The routine use of reliable delirium evaluation tools such as Nu-DESC by nurses may be beneficial in the early detection of delirium.

Advanced age is the leading risk factor for delirium (30). In the present study, a positive, weakly significant correlation was determined between age and the Nu-DESC mean scores. As the age progresses, The Nu-DESC mean scores of the patients also increase. The fact that patients in the ICU are older is important in terms of the risk of delirium. The majority (88.9%) of the intensive care patients in the current study were over the age of 40. Individuals are more likely to have serious illnesses with advancing age, and this may also result in a longer hospital stay.

Medical conditions such as sepsis, respiratory failure, metabolic imbalances are among the predisposing risk factors. The increased burden of comorbid disease further increases the risk (31). It was reported that adding delirium to chronic diseases would increase mortality (32). In the present study, although the Nu-DESC mean scores of those with chronic diseases were higher, a statistically significant difference was not found. The small number of patients included in the study may have affected the results.

In the current study, the Nu-DESC mean scores of patients with respiratory distress and ventilator support were found to be significantly higher. Delirium may have caused longer mechanical ventilation and adversely affected the patients. In the literature, it has been reported that critical patients requiring mechanical ventilation are at high risk for delirium (33), and approximately 80-87% of patients have delirium (1,34). The results of the present study are in harmony with the studies.

More than half of the patients in the ICU were postoperative. In addition, the Nu-DESC mean scores of the patients experiencing pain were found to be very significantly high. Increased pain levels have been shown to increase delirium due to increased stress response, especially in the postoperative setting (31). The result of the current study supports the literature.

The presence of delirium is also a sign of poor prognosis (26) and an independent predictor of mortality (35). It has been estimated that the mortality rates of patients with delirium during hospitalization are 25-75% during their hospitalization (26). In the present study, the mortality rate was 27.3%. Although there was no statistical significance, the Nu-DESC mean scores of the patients were higher than those who were discharged. Our finding is consistent with studies reporting no relationship between delirium and mortality (1,36).

Prevention of delirium is possible by non-pharmacological means (e.g. orientation, landscaping) (28,37). Current guidelines recommend routine screening for delirium in all ICU patients. Within 24 hours of ICU admission, it is recommended to evaluate individuals at risk for clinical factors contributing to the occurrence of delirium and provide an intervention tailored to the individual needs of patients and the setting of care based on the results of the evaluation (38). Nursing practices can be effective in preventing delirium and shortening its duration in intensive care. The most important aspect of patient-centered care is preventing delirium (35). In a meta-analysis by Liang et al. (39), studies involving delirium prevention interventions among intensive care patients were examined, and physical environment regulation, daily observation of patients in terms of behavioral changes and fluctuations, and evaluation with approved measurement tools (38) were found to be effective in preventing delirium (39). Similarly, according to the Guidelines of the Society of Critical Care Medicine (SCCM), updated in 2018, and the Evidence and Opinion-Based Guidelines for the Management of Analgesia, Sedation, and Delirium in Intensive Care (2015), applications such as providing physiological support and person-space-time orientation, early mobilization, cognitive stimulation, reducing noise and light, establishing sleep patterns, and visitations in the ICU reduce the risk of delirium, the length of stay in the hospital, and increase the patients' satisfaction (40,41). At this point, nurses should know and apply current methods that may minimize the risk of delirium.

Limitations

The fact that the study was conducted in a single ICU and the number of patients was low caused limitations in determining the risk factors. In addition, the fact that the drugs taken by the patients (especially sedatives and steroids) were not recorded in the study prevented us from revealing the dose relationships and the correlation between the excessive use of these drugs and the risk of delirium.

CONCLUSION

In the present study, delirium and risk factors that may cause delirium were investigated by using the Nu-DESC, which was accepted as a delirium screening scale for intensive care patients. Of the 55 patients included in the study, 54 demonstrated delirium symptoms during the ICU. Patients who develop delirium after admission to the ICU may present different characteristics from the patients who already have delirium at the time of admission to the ICU. Considering that the cause of delirium is multifactorial, non-pharmacological

environmental interventions such as early mobilization, regular sleep, effective treatment of pain, and regulation of noise and light may be promising for the prevention of delirium. In the current study, advanced age, mechanical ventilator, isolation, and presence of pain were determined as risk factors for delirium. It was concluded that the identification and follow-up of patients with risk factors for delirium by the nurses working in the ICU would contribute to the early diagnosis and treatment of delirium.

The results of the study revealed the necessity of using measurement tools for the early detection of delirium in clinical practice by nurses. Enabling nurses to evaluate delirium with scales in order to increase the quality of care for patients may be effective in preventing complications that may develop. We believe that it would be useful to add standard rating scales to daily routine evaluation forms in order to record delirium systematically. In addition, this study may shed light on future studies on delirium nursing.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Gaziantep University Clinical Researches Ethics Committee (Date: 07.02.2022, Decision No: 2022/03).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

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